# MMAC-Plus™
# Installation Guide
# for Use with the 9C114 and 9C714 Chassis

CABLETRON SYSTEMS
The Complete Networking Solution™

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# FCC Notice

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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# DOC Notice

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Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

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This equipment is in the 1st Class Category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council for Interference by Information Technology Equipment (VCCI) aimed at preventing radio interference in commercial and/or industrial areas.

Consequently, when used in a residential area or in an adjacent area thereto, radio interference may be caused to radios and TV receivers, etc.

Read the instructions for correct handling.

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取扱説明書に従って正しい取り扱いをして下さい。

# DECLARATION OF CONFORMITY

| | |
|---|---|
| Application of Council Directive(s): | **89/336/EEC**<br>**73/23/EEC** |
| Manufacturer's Name: | **Cabletron Systems, Inc.** |
| Manufacturer's Address: | **35 Industrial Way**<br>**PO Box 5005**<br>**Rochester, NH 03867** |
| European Representative Name: | **Mr. J. Solari** |
| European Representative Address: | **Cabletron Systems Limited**<br>**Nexus House, Newbury Business Park**<br>**London Road, Newbury**<br>**Berkshire RG13 2PZ, England** |
| Conformance to Directive(s)/Product Standards: | **EC Directive 89/336/EEC**<br>**EC Directive 73/23/EEC**<br>**EN 55022**<br>**EN 50082-1**<br>**EN 60950** |
| Equipment Type/Environment: | **Networking Equipment, for use in a Commercial or Light Industrial Environment.** |

We the undersigned, hereby declare, under our sole responsibility, that the equipment packaged with this notice conforms to the above directives.

| Manufacturer | Legal Representative in Europe |
|---|---|
| Mr. Ronald Fotino | Mr. J. Solari |
| Full Name | Full Name |
| Principal Compliance Engineer | Managing Director - E.M.E.A. |
| Title | Title |
| Rochester, NH, USA | Newbury, Berkshire, England |
| Location | Location |

# Introduction

This document contains information necessary to install the MMAC-Plus 9C114 and 9C714 chassis. It is designed for the initial installation only. For detailed operational information on the various MMAC-Plus components, refer to the following manuals:

**MMAC-Plus 9C300-1 Environmental Module User's Guide**

**MMAC-Plus 9C214-1 AC Power Supply Installation Guide**

**MMAC-Plus 9C214-2 DC Power Supply Installation Guide**

**Local Management User's Guide**

In addition, each Interface Module has a User's Guide.

# The MMAC-Plus

The MMAC-Plus chassis is a networking platform that provides support for the configuration and operation of up to fourteen Cabletron Systems MMAC-Plus interface modules.

## Features

### Multiple Technology Support

The design of the chassis allows it to provide support for existing and future Local Area Networking technologies such as Ethernet, Fast Ethernet, Gigabit Ethernet, Token Ring, Fiber Distributed Data Interface (FDDI), Systems Network Architecture (SNA), Wide Area Networks (WAN), and Asynchronous Transfer Mode (ATM).

### Redundant Power Supply Modules

The 9C114 and 9C714 support the installation of two power supplies for power supply redundancy and load sharing. If a 9C500 Power Box is used, up to six power supplies may be installed.

### 9C300-1 Environmental Module

The 9C300-1 Environmental Module provides out-of-band management capabilities, monitors power supply and environmental status, and has a built-in cooling system. The 9C300-1 Environmental Module is also "hot swappable" so that it can be removed for repair or replacement without causing network downtime. For details refer to the **MMAC-Plus 9C300-1 Environmental Module User's Guide**.

## The Backplane

The 9C114 MMAC-Plus provides six distinct backplane buses, and the 9C714 provides an additional seventh bus, the Cell Transfer Matrix. Each bus serves a particular set of needs. The seven backplane buses are shown in Figure 1.

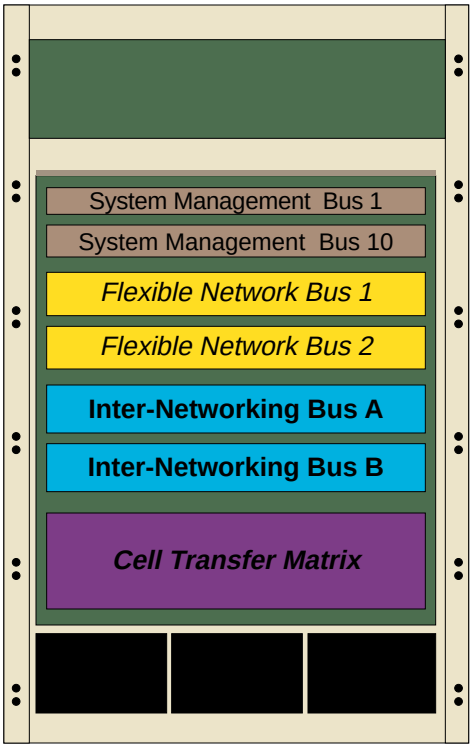


Figure 1. The MMAC-Plus Backplane Buses

The descriptions of the seven backplane buses are as follows:

### System Management Bus 1

The System Management Bus 1, abbreviated SMB-1, is a management bus devoted solely to transferring management information between the modules in the chassis. It is through the SMB-1 that modules inform each other, and the Environmental Module, of their current operating status, diagnostic test results, initialization queries and other information. The SMB-1 operates at 1 Mbps, and every module in the chassis has a connection to it.

### System Management Bus 10

The System Management Bus 10, or SMB-10, performs similar functions to those of the SMB-1 previously discussed in this section. The SMB-10 bus is devoted to the transfer of management data within the chassis, but is used for out-of-band or Local Management operations. The SMB-10 operates at Ethernet speeds of 10 Mbps, and is connected to any manageable module in the chassis. Access to the SMB-10 for Local Management operations is provided through an Ethernet Port Interface Module (EPIM) slot on the 9C300 Environmental Module, or through the serial COM ports, also located on the Environmental Module. The SMB-10 can also be accessed from in-band management through a Telnet application.

### The Flexible Network Buses

The Flexible Network Buses, FNB-1 and FNB-2, are the primary backplane buses used to connect MMAC-Plus modules for shared network designs. Each FNB bus operates as a dual, counterrotating Fiber Distributed Data Interface (FDDI) ring. Each FNB bus operates at 100 Mbps, and consists of one primary ring and its associated secondary ring. In the event of a failure of a station or a connection, the signals from the primary ring are wrapped onto the secondary ring, creating a single ring and allowing network traffic to continue circulating. The construction of the FNB backplanes includes shunting connectors which allow network signals to pass by unpopulated slots in the chassis. This design frees Network Managers from a dependence on specific ordering or placement of modules, and allows modules to be removed from the FNB without causing a wrap of the FDDI ring.

### The Internal Network Buses

The Internal Network Buses, abbreviated INB-1 and INB-2, are designed to simultaneously support both packet and ATM cell transport. Each INB data channel is 64 bits wide (56 byte data bus and 8 byte management and control bus) and runs at a clock rate of 40 mhz, yielding a sustained data rate of 2 Gbps, and a burst rate of 2.5 Gbps. The 8 byte management and control bus allows all signaling and bus arbitration functions to occur out-of-band with regard to user data.

### The Cell Transfer Matrix (installed in the 9C714 chassis only)

The Cell Transfer Matrix provides a Time Division Multiplexed (TDM) based mesh of full duplex, high speed (1.6 Gbps) dedicated interconnections capable of carrying standard ATM cell traffic. These interconnections are a series of point-to-point links between an individual module, and every other module that directly connects to the Cell Transfer Matrix. If the 9C714 chassis has 14 modules that connect to the CTM installed, there are 182 point-to-point links between all the modules, providing a total aggregrate switching capacity of 75 Gbps.

# Getting Help

If you need additional support related to this device, or if you have any questions, comments, or suggestions concerning this manual, contact Cabletron Systems Technical Support:

| | |
|---|---|
| Phone | (603) 332-9400<br>Monday – Friday; 8 A.M. – 8 P.M. Eastern Time |
| CompuServe | GO CTRON from any ! prompt |
| Internet mail | support@ctron.com |
| FTP<br>Login<br>Password | ctron.com (134.141.197.25)<br>*anonymous*<br>*your email address* |
| BBS<br>Modem setting | (603) 335-3358<br>8N1: 8 data bits, No parity,1 stop bit |
| For additional information about Cabletron Systems products, visit our World Wide Web site: http://www.cabletron.com/ | |

# Site Guidelines

The following guidelines must be followed to select a suitable site for the MMAC-Plus. If not, unsatisfactory network performance may result.

The site must have an unrestricted free surface area around the MMAC-Plus chassis, allowing for free movement of air. An open space of at least 84 high by 63.5 wide by 81.24 centimeters deep (33 high by 25 wide by 32 inches deep) is the minimum recommended. If the unit is installed in an enclosed equipment cabinet, the cabinet should have a built-in cooling fan.The maximum theoretical heat dissipation of the MMAC-Plus is 8700 BTUs per hour. Actual heat dissipation will vary depending on the modules installed in the MMAC-Plus chassis. The temperature of the location must be maintained between 5° and 40°C (40° and 104°F). Changes in temperature greater than 10°C (18°F) per hour should not occur.

A standard 3-prong power receptacle must be located within 6 feet of the system. One circuit is recommended for each power supply. The AC wiring for the receptacle must be able to supply 12 amps at 120 volts or 6 amps at 220 volts.

# Installation

## Required Tools

The following tools are required to install the 9C114 and 9C714 chassis:

- Phillips Screwdriver
- Flathead Screwdriver
- Electrostatic Discharge (ESD) Wrist Strap (provided with the chassis)

## Unpacking the MMAC-Plus Chassis

Unpack the chassis by following the steps below:

1. Remove the unit from the shipping box.
2. Remove the protective plastic bag.
3. Remove the accessory package.
4. Remove the Electrostatic Discharge (ESD) Wrist Strap package.

## Installation Order

Once a suitable site has been chosen, the MMAC-Plus may be installed. The unit may be free standing or rack mounted.

It is recommended that the MMAC-Plus installation proceed in this order:

1. Mount the chassis to the rack or other secure location.
2. Install the power supply(ies).
3. Attach the Electrostatic Discharge (ESD) Wrist Strap.
4. Install the Environmental Module.
5. Install the Interface Modules.
6. If necessary, install the INB Terminator Modules.

## Rack Mounting the Chassis

The chassis can be mounted in a standard 19-inch equipment rack. If the rack is not secured to the floor, it is recommended that the MMAC-Plus be installed in the bottom half of the rack. This will prevent the rack from being top heavy. Two people may be required to lift the chassis into place.

The chassis is secured with twelve bolts, six on each side. Using the bolts provided with the rack, bolt the chassis to the rack, starting with the bottom holes and working up, as shown in Figure 2.

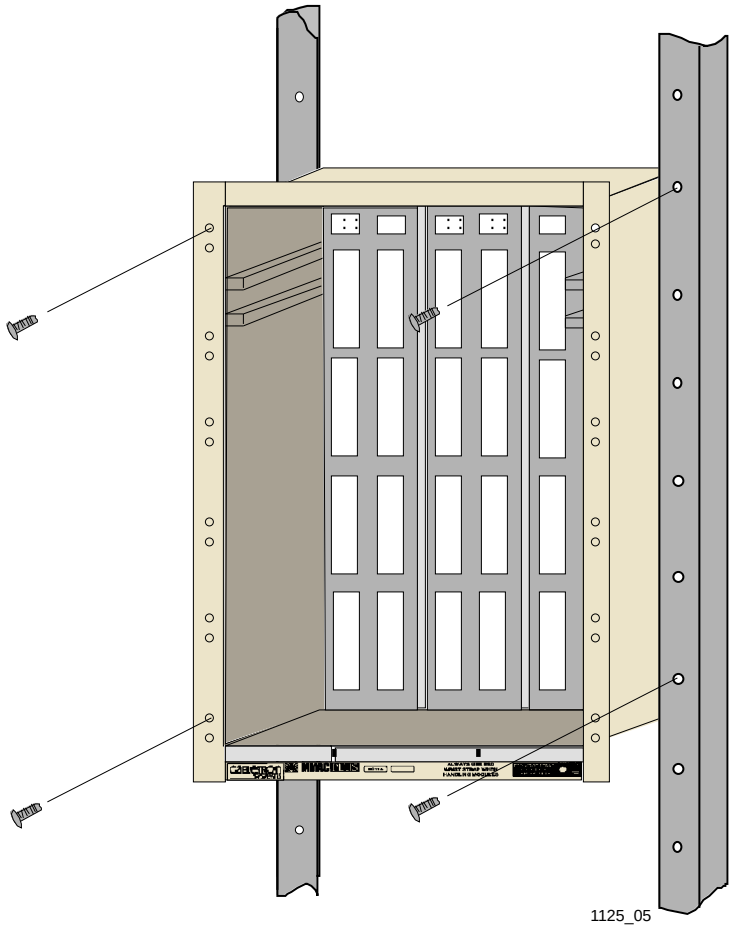


Figure 2. Rack Mounting the Chassis

## Installing a Power Supply

At least one power supply must be installed on the rear of the MMAC-Plus chassis. Additional power supplies can be added to achieve redundancy.

A power supply is installed by plugging it into either the left or right power supply connector on the MMAC-Plus chassis, as shown in Figure 3.

Install a power supply by following the steps below:

1. Unpack the power supply by removing it from the shipping box and sliding the two foam end caps off the unit. (Save the shipping box and packing materials in the event the power supply must be reshipped.)
2. Remove the power supply from the protective plastic bag. (Save the bag in the event the power supply must be reshipped.)
3. Examine the power supply carefully, checking for damage. If any damage exists, DO NOT install the power supply. Immediately contact Cabletron Systems Technical support.
4. Loosen and remove the two screws from one of the power supply connector covers on the rear of the MMAC-Plus chassis.
5. Remove the cover. (Keep the cover in the event you need to remove the power supply. The cover must be replaced to protect the connector.)
6. Hold the power supply by the handles on the top and bottom of the unit and do the following:
    a. Align the power supply so that the lip on the bottom and the hook on the top are slightly above the corresponding slots on the chassis.
    b. Ease the power supply down until the hook catches the slot on the top and the tab is inserted in the slot on the bottom.
    c. Plug the power supply into the corresponding connector on the back of the chassis by pushing the power supply until its frame touches the surface of the MMAC-Plus chassis. Do not force the power supply in place. If significant resistance is encountered before the frame is flush with the chassis, remove the power supply, realign it, and push it in again.
    d. Secure the power supply to the chassis by tightening the four screws on the top and bottom of the power supply. For proper chassis grounding, the four slotted screws must be properly tightened.
7. If you are installing a second power supply, repeat steps 1–6.

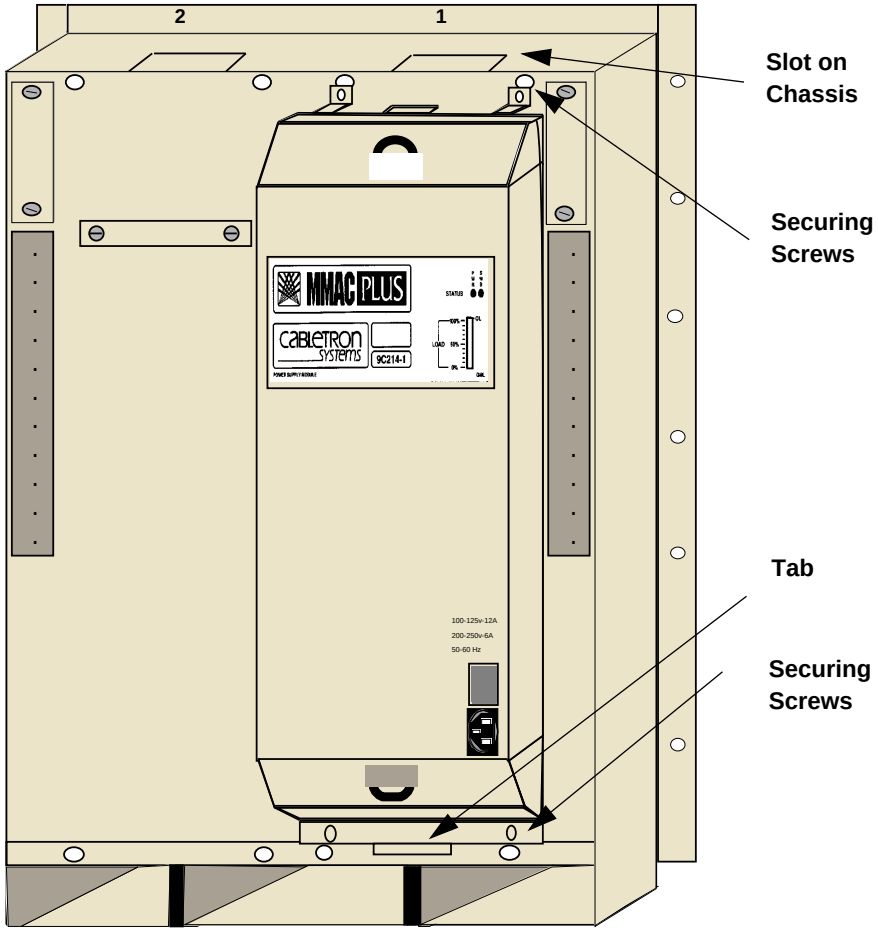


Figure 3. Installing a Power Supply

## Attaching the Electrostatic Discharge (ESD) Wrist Strap

The ESD Wrist Strap must be attached before handling the Environmental Module or MMAC-Plus Interface Modules. In addition, observe all precautions when handling these modules to prevent damage from ESD.

Attach the ESD Wrist Strap by following the steps below:

1. Attach one end of the ESD Wrist Strap to your wrist.
2. Plug the other end into the ESD Wrist Strap grounding receptacle in the front lower right corner of the MMAC-Plus chassis, as shown in Figure 4.

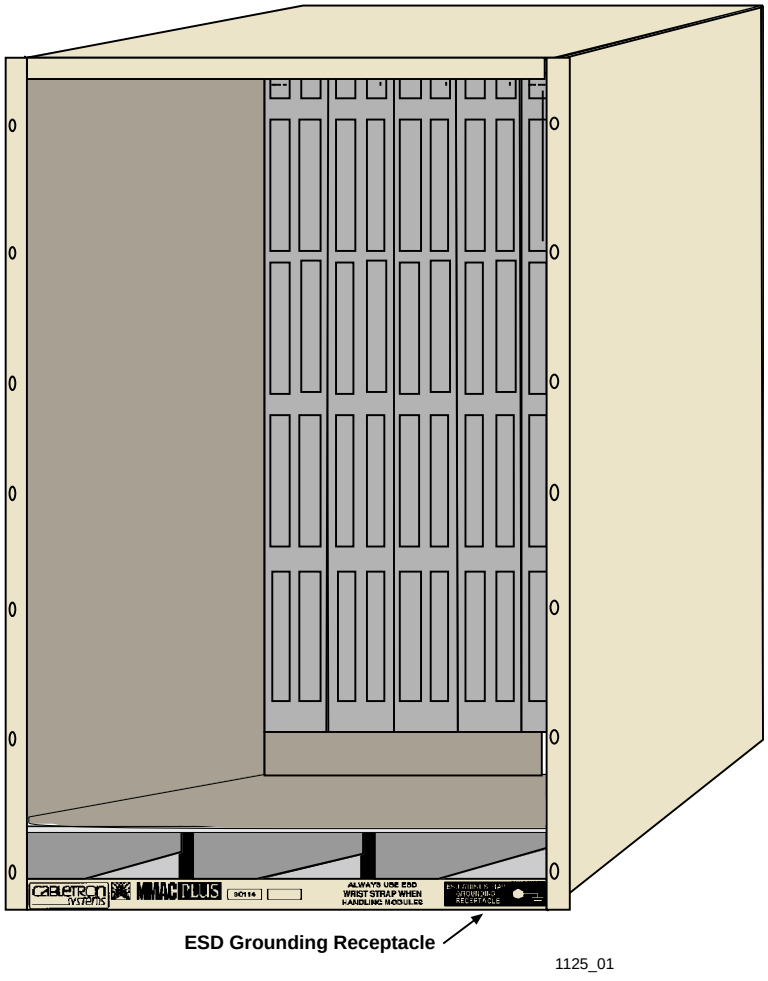


Figure 4. Attaching the ESD Wrist Strap

## Installing the Environmental Module

The Environmental Module is installed in the slot above the module card cage in the front of the MMAC-Plus chassis, as shown in Figure 5, by following the steps below:

1. Unpack the Environmental Module by carefully removing it from the shipping box and sliding the two foam end caps off of the unit. (Save the shipping box and packing materials in the event the Environmental Module must be reshipped.)
2. Remove the Environmental Module from the protective plastic bag. (Save the bag in the event the Environmental Module must be reshipped.) Observe all precautions to prevent damage from Electrostatic Discharge (ESD).
3. Remove the plastic protective cap that covers the connector on the rear of the Environmental Module.
4. Examine the Environmental Module, carefully checking for damage. If any damage exists, DO NOT install the Environmental Module. Immediately contact Cabletron Systems Technical Support.
5. Hold the left and right sides of the Environmental Module.
6. Line up the rails on the left and right sides of the Environmental Module with the tracks on the left and right inside panels of the chassis.
7. Slide the Environmental Module into the chassis until it is completely seated.

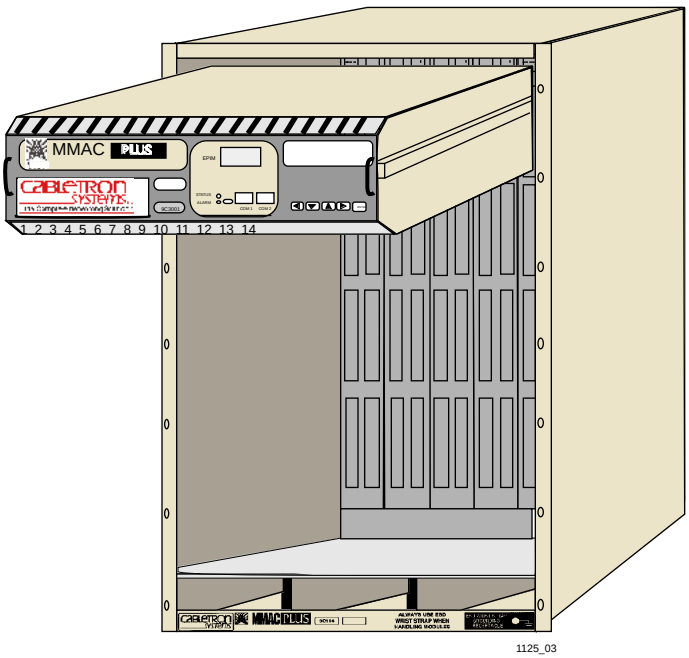


Figure 5. Installing the Environmental Module

## Installing MMAC-Plus Interface Modules

MMAC-Plus Interface Modules can be installed in any of the 14 slots that are available. To install Interface Modules, follow the steps below:

1. Remove the blank panel, covering the slot in which the Interface Module will be installed. All other slots must remain covered to ensure proper airflow and cooling.
2. Unpack the Interface Module by carefully removing it from the shipping box. (Save the box and packing materials in the event the module must be reshipped.)
3. Remove the Interface Module from the plastic bag. (Save the bag in the event the Interface Module must be reshipped.) Observe all precautions to prevent damage from Electrostatic Discharge (ESD).
4. Examine the Interface Module, carefully checking for damage. If any damage exists, DO NOT install the Interface Module. Immediately contact Cabletron Systems Technical Support.
5. Install the Interface Module in the chassis by sliding it in any available slot and locking down the top and bottom plastic tabs, as shown in Figure 6. Take care that the Interface Module slides in straight and properly engages the backplane connectors. When installing the Interface Module, ensure that the circuit card is between the card guides, as shown in Figure 6. Check both the upper and lower tracks.
6. If you are installing additional Interface Modules, repeat steps 1–5.

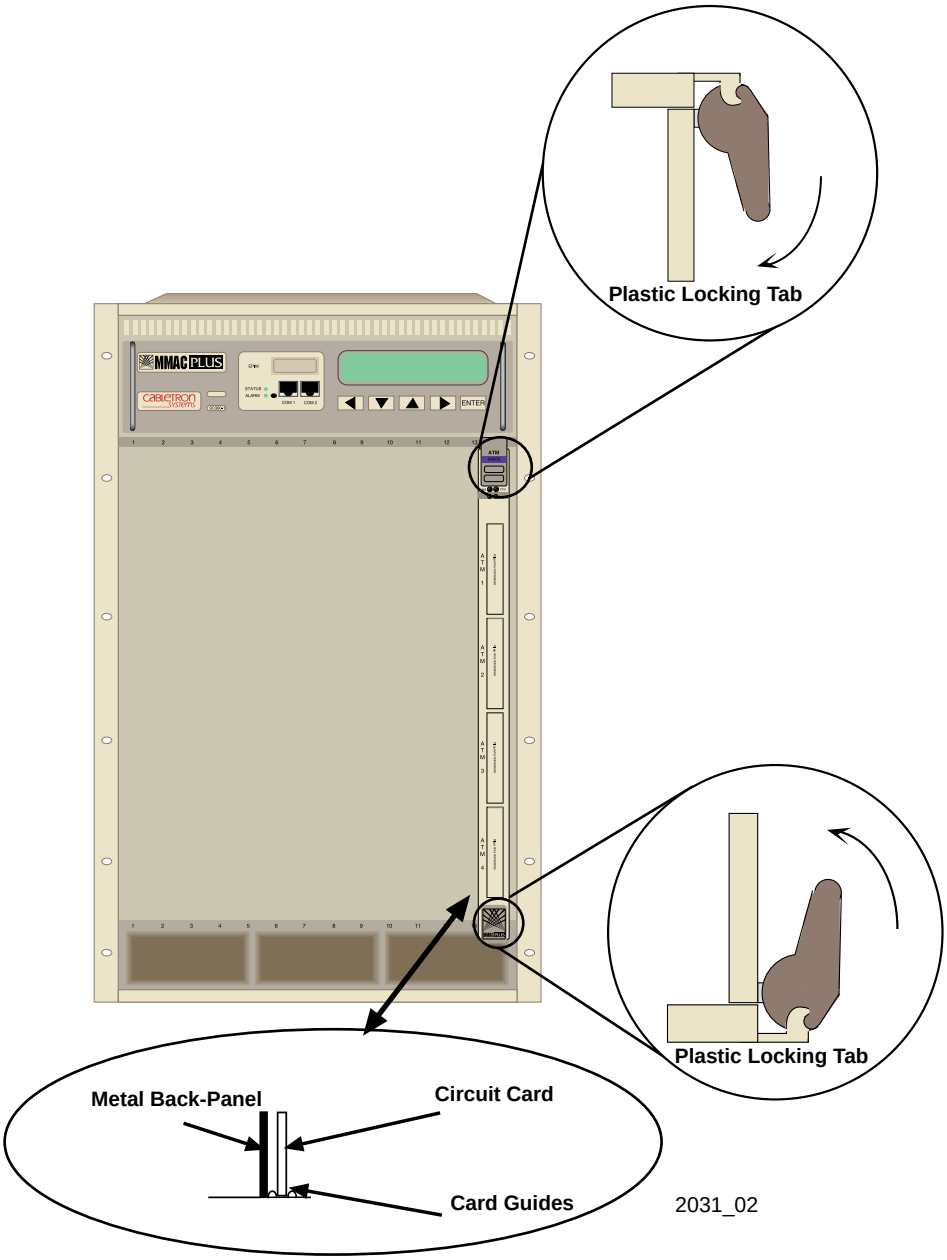


Figure 6. Installing MMAC-Plus Interface Modules

## Attaching 9C614 INB Terminator Modules

Two 9C614 INB Terminator Modules must be attached to the rear of the MMAC-Plus chassis when Interface Modules that use the INB are inserted in the front of the chassis. These modules provide proper termination for the Internal Network Bus (INB).

The INB Terminator Modules are attached by following the steps below:

1. Remove the INB Terminator Modules from the shipping box. (Save the box and packing materials in the event the module must be reshipped.)
2. Hold the INB Terminator Module by the handle and line up the screws that extend from the module with the screw holes in one of the INB Termination Connectors on the rear of the MMAC-Plus chassis (Figure 7).
3. Push the INB Terminator Module in gently until the frame of the module touches the frame of the chassis.
4. Tighten the screws on the INB Terminator Module.
5. Repeat steps 1–4 to attach the second INB Terminator Module.

NOTE

*The INB Terminator Module is designed to fit in either INB Termination Connector on the MMAC-Plus chassis. If the screws that extend from the module do not line up with the screw holes on the INB Connector, turn the module over.*

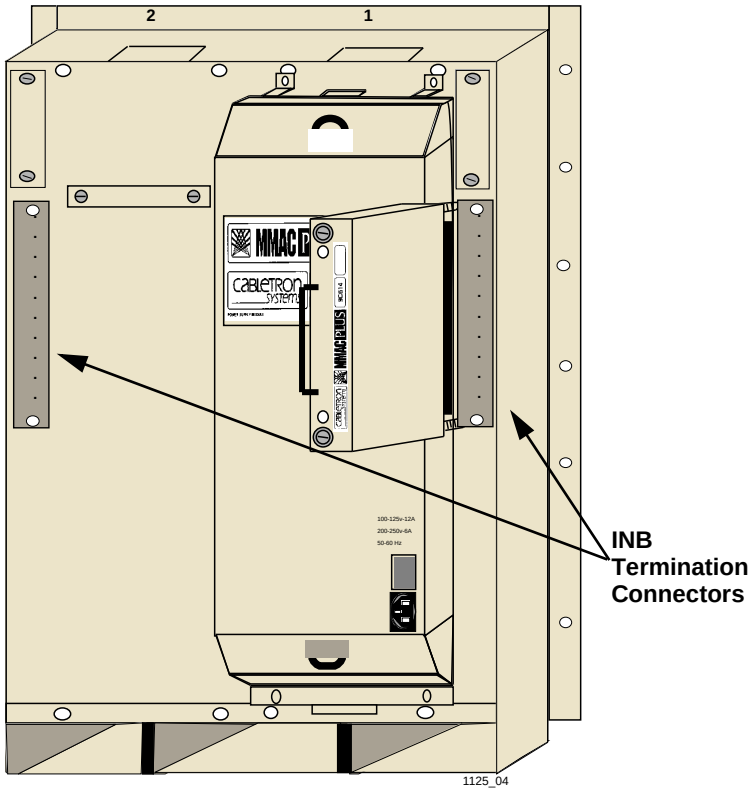


Figure 7. Attaching the INB Terminator Modules

# Powering up the MMAC-Plus

The MMAC-Plus chassis is powered up by following the steps below:

1. Plug one end of the power cord (supplied with the power supply) into the AC power socket on the lower right front corner of the power supply.
2. Plug the other end of the power cord into an AC receptacle. Turn on the power supply using the switch located near the power socket.
3. The power supply uses a soft start feature and does a pre-power diagnostic check. Outputs become enabled within 5 seconds of turning the power on.
4. Check that the PWR and SMB LEDs on the power supply are green.

   If the LEDs are any color other than green, refer to the **Power Supply User's Guide**.
5. Check that all LEDs on the INB Terminator Module are green.

   If the LEDs are any color other than green, refer to the **INB Terminator Module Installation Guide**.
6. Check that the Status and Alarm LEDs on the Environmental Module are green.

   If the LEDs are not green, refer to the **Environmental Module User's Guide**.
7. Check that the System Management Bus (SMB) and the Board OK (BOK) LEDs on the front panel of each installed Interface Module are green. (Be sure the boards have completed booting; this may take up to 20 seconds.)

   If an Interface Module's SMB and BOK LEDs are not green, refer to the User's Guide for that Interface Module.

# Operating Specifications

## Environmental Requirements

| | |
|---|---|
| Operating Temperature: | 5°C to 40°C (41°F to 104°F) |
| Storage Temperature: | -30°C to 90°C (-22°F to 194°F) |
| Operating Relative Humidity: | 5% to 90% (non-condensing) |

## Regulatory Compliance

### Safety

This equipment meets the safety requirements of UL 1950, CSA C22.2 No. 950, EN 60950, IEC 950 and 73/23/EEC.

### Electromagnetic Compatibility

This equipment meets the requirements of FCC Part 15, EN 55022, VCCI V-3/93.01, CSA C108.8, EN 50082-1 and 89/336/EEC.

## 9C114 MMAC-Plus Chassis

### Dimensions

76.2 H x 48.3 W x 49.3 D centimeters
(30 H x 19 W x 19.4 D inches)

### Weight

Unit: 19.96 kilograms (44 pounds)
Shipping:24.95 kilograms (55 pounds)

## 9C714 MMAC-Plus Chassis

### Dimensions

76.2 H x 48.3 W x 49.3 D centimeters
(30 H x 19 W x 19.4 D inches)

### Weight

Unit: 19.96 kilograms (44 pounds)
Shipping:24.95 kilograms (55 pounds)

## 9C300-1 Environmental Module

**Dimensions**
12.7 H x 43.2 W x 44.5 D centimeters
(5 H x 17 W x 17.5 D inches)

**Weight**
Unit: 6.5 kilograms (14 pounds)
Shipping: 7.7 kilograms (17 pounds)

## 9C214-1 Power Supply

**Dimensions**
61 H x 19.1 W x 14 D centimeters
(24 H x 7.5 W x 5.5 D inches)

**Weight**
Unit: 7.7 kilograms (17 pounds)
Shipping: 9.07 kilograms (20 pounds)

## 9C614 INB Terminator Module

**Dimensions**
21.59 H x 2.22 W x 14.92 D centimeters
(8.5 H x 0.875 W x 5.875 D inches)

**Weight**
Unit: 0.45 kilograms (1 pound)
Shipping: 0.68 kilograms (1.5 pounds)